CLAIMS

We claim:

1. A device for performing numerical value conversion of a digital input value in a first unit to a second unit being a natural unit, the first unit being related to the second unit by a first equation, comprising:

a look-up table storing a plurality of coefficients for performing the numerical value conversion from the first unit to the second unit, the look-up table being indexed using a first parameter to provide a selected coefficient; and

an arithmetic logic unit receiving the digital input value in the first unit and the selected coefficient from the look-up table, the arithmetic logic unit performing the numerical value conversion based on the first equation and using the selected coefficient to compute a digital output value in the second unit.

2. The device of claim 1, wherein the first unit comprises an arbitrary unit and the second unit comprises a natural unit of physical measurement.

3. The device of claim 2, wherein the numerical value conversion from the arbitrary unit to the natural unit has a linear relationship described by the equation $D_N = m\ D_A + c$, where D_A is the digital input value, D_N is the digital output value, m is a slope coefficient and c is an offset coefficient, and the plurality of coefficients comprises a plurality of coefficient pairs, each coefficient pair comprising a slope coefficient and an offset coefficient.

4. The device of claim 2, wherein the numerical value conversion from the arbitrary unit to the natural unit has a non-linear relationship and the plurality of coefficients implements the numerical value conversion in a piecewise-linear fashion approximating the non-linear relationship.

5. The device of claim 4, wherein the look-up table stores the plurality of coefficients for a plurality of linear segments for performing the piecewise-linear numerical value conversion, each linear segment being described by the equation $D_N = m\ D_A + c$, where D_A is the digital input value, D_N is the digital output value, m is a slope coefficient and c is an offset coefficient for the respective linear segment, and the plurality of coefficients comprises a plurality of coefficient pairs, each coefficient pair comprising a slope coefficient and an offset coefficient for the respective linear segment.

6. The device of claim 4, wherein the non-linear relationship comprises a logarithmic relationship.

7. The circuit of claim 2, wherein digital input value comprises a digitized value in an arbitrary unit generated by an analog-to-digital converter and the second unit comprises a natural unit of physical measurement.

8. The device of claim 1, wherein the first parameter comprises a system operating condition associated with a system providing the digital input value.

9. The device of claim 8, wherein the first parameter comprises an operating temperature associated with the system providing the digital input value and wherein each coefficient in

the look-up table corresponds to an assigned range of the operating temperature.

10. The device of claim 1, wherein the digital input value comprises an N-bit digital value and the first parameter comprises the most significant k bits of the digital input value where k is less than N.

11. The device of claim 10, wherein digital input value comprises a digitized voltage value in an arbitrary unit generated by an analog-to-digital converter and the second unit comprises a Decibel unit.

12. The device of claim 1, further comprises:

a multiplexor coupled to receive the first parameter and a second parameter, the multiplexor receiving a select signal for selecting one of the first parameter and the second parameter,

wherein the look-up table is indexed by the selected one of the first and second parameters.

13. A method for performing numerical value conversion of a digital input value in a first unit to a second unit being a natural unit, the first unit being related to the second unit by a first equation, comprising:

storing a plurality of coefficients in a look-up table for performing the numerical value conversion from the first unit to the second unit;

indexing the look-up table using a first parameter to provide a selected coefficient;

providing the digital input value and the selected coefficient to an arithmetic logic unit; and

performing a numerical value conversion at the arithmetic logic unit based on the first equation and using the selected coefficient to compute a digital output value in the second unit from the digital input value in the first unit.

14. The method of claim 13, wherein indexing the look-up table using a first parameter to provide a selected coefficient comprises:

selecting the first parameter from a plurality of indexing parameters using a select input signal; and

indexing the look-up table using the first parameter selected from the plurality of indexing parameters.

15. The method of claim 13, wherein the first unit comprises an arbitrary unit and the second unit comprises a natural unit of physical measurement.

16. The method of claim 15, wherein storing a plurality of coefficients in a look-up table for performing the numerical value conversion from the first unit to the second unit comprises:

storing a plurality of coefficients in the look-up table wherein the numerical value conversion from the arbitrary unit to the natural unit has a linear relationship described by the equation $D_N = m\ D_A + c$, where D_A is the digital input value, D_N is the digital output value, m is a slope coefficient and c is an offset coefficient, and the plurality of coefficients comprises a plurality of coefficient pairs, each coefficient pair comprising a slope coefficient and an offset coefficient.

17. The method of claim 15, wherein storing a plurality of coefficients in a look-up table for performing the numerical value conversion from the first unit to the second unit comprises:

storing a plurality of coefficients in the look-up table wherein the numerical value conversion from the arbitrary unit to the natural unit has a non-linear relationship and the plurality of coefficients implements the numerical value conversion in a piecewise-linear fashion approximating the non-linear relationship.

18. The method of claim 17, wherein storing a plurality of coefficients in the look-up table further comprises:

storing coefficients for a plurality of linear segments for performing the piecewise-linear numerical value conversion, each linear segment being described by the equation $D_N = m\ D_A + c$, where D_A is the digital input value, D_N is the digital output value, m is a slope coefficient and c is an offset coefficient for the respective linear segment,

wherein the plurality of coefficients comprises a plurality of coefficient pairs, each coefficient pair comprising a slope coefficient and an offset coefficient for the respective linear segment.

19. The method of claim 13, wherein the first parameter comprises a system operating condition associated with a system providing the digital input value.

20. The method of claim 19, wherein the first parameter comprises an operating temperature associated with the system

providing the digital input value and wherein each coefficient in the look-up table corresponds to an assigned range of the operating temperature.

21. The method of claim 13, wherein the digital input value comprises an N-bit digital value and the first parameter comprises the most significant k bits of the digital input value where k is less than N.